

Claims

- [c1] 1. A navigation device comprising:
- a map information acquirer for acquiring map information;
 - a current position information acquirer for acquiring current position information on a current position of a moving body;
 - a destination information acquirer for acquiring destination information on a location of a destination to which the moving body moves;
 - a traffic information acquirer for acquiring traffic information on a traffic condition relating to the moving body;
 - a traveling route searcher that can search a plurality of traveling routes of the moving body on the basis of the current position information and the destination information and by using the map information;
 - a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic information acquirer;
 - and
 - a notifier for notifying at least one of the plurality of

traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

- [c2] 2. The navigation device according to claim 1, further comprising:
- a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element; and
 - a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information,
- wherein the trouble extent recognizer recognizes the extent of trouble on the basis of at least the traffic information acquired by the traffic information acquirer or the traffic condition recognized by the traffic condition recognizer.

- [c3] 3. A navigation device comprising:
- a map information acquirer for acquiring map information;
 - a current position information acquirer for acquiring

current position information on a current position of a moving body;

a destination information acquirer for acquiring destination information on a location of a destination to which the moving body moves;

a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;

a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information;

a traveling route searcher that can search a plurality of traveling routes of the moving body on the basis of the current position information and the destination information and by using the map information;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic condition recognizer;

and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes

to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

[c4] 4. The navigation device according to claim 1, wherein the traveling route searcher recognizes the extent of trouble of each of the plurality of searched traveling routes so as to increase the number of traveling routes to be notified by the notifier as a function of increase in the overall extent of trouble as determined on the basis of each extent of trouble.

[c5] 5. The navigation device according to claim 3, wherein the traveling route searcher recognizes the extent of trouble of each of the plurality of searched traveling routes so as to increase the number of traveling routes to be notified by the notifier as a function of increase in the overall extent of trouble as determined on the basis of each extent of trouble.

[c6] 6. The navigation device according to claim 1, wherein the traveling route searcher searches the traveling route so as to decrease the number of traveling routes to be notified by the notifier as a function of increase in the number of searched traveling routes showing an extent of trouble not higher than a predetermined level.

[c7] 7. The navigation device according to claim 3, wherein the traveling route searcher searches the traveling route so as to decrease the number of traveling routes to be notified by the notifier as a function of increase in the number of searched traveling routes showing an extent of trouble not higher than a predetermined level.

[c8] 8. A navigation device comprising:
a map information acquirer for acquiring map information;
a current position information acquirer for acquiring current position information on a current position of a moving body;
a traffic information acquirer for acquiring traffic information on a traffic condition relating to the moving body;
a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic information acquirer;
a traveling route searcher for searching a plurality of traveling routes to avoid an area with the trouble using the map information on the basis of the current position information by recognizing the trouble and the extent of trouble by the trouble extent recognizer; and
a notifier for notifying at least one of the plurality of

traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

- [c9] 9. The navigation device according to claim 8, further comprising:
- a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element; and
 - a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information,
- wherein the trouble extent recognizer recognizes the extent of trouble on the basis of at least the traffic information acquired by the traffic information acquirer or the traffic condition recognized by the traffic condition recognizer.

- [c10] 10. A navigation device comprising:
- a map information acquirer for acquiring map information;
 - a current position information acquirer for acquiring

current position information on a current position of a moving body;

a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;

a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on the basis of the traffic condition recognized by the traffic condition recognizer;

a traveling route searcher that can search a plurality of traveling routes to avoid an area with the trouble using the map information on the basis of the current position information by recognizing the trouble and the extent of trouble by the trouble extent recognizer; and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

- [c11] 11. The navigation device according to claim 8, wherein the trouble extent recognizer recognizes the extent of trouble in a predetermined area in the map information.
- [c12] 12. The navigation device according to claim 10, wherein the trouble extent recognizer recognizes the extent of trouble in a predetermined area in the map information.
- [c13] 13. The navigation device according to claim 8, wherein the trouble extent recognizer recognizes the extent of trouble in a predetermined area including the current position of the moving body on the basis of the current position information.
- [c14] 14. The navigation device according to claim 10, wherein the trouble extent recognizer recognizes the extent of trouble in a predetermined area including the current position of the moving body on the basis of the current position information.
- [c15] 15. The navigation device according to claim 8, further comprising:
a moving direction detector for detecting the moving direction of a moving body,
wherein the trouble extent recognizer recognizes the extent of trouble in a predetermined area located forwardly in the moving direction of the moving body as

detected by the moving direction detector.

- [c16] 16. The navigation device according to claim 10, further comprising:
a moving direction detector for detecting the moving direction of a moving body,
wherein the trouble extent recognizer recognizes the extent of trouble in a predetermined area located forwardly in the moving direction of the moving body as detected by the moving direction detector.
- [c17] 17. The navigation device according to claim 1, wherein the notifier notifies that there is no trouble when the trouble extent recognizer cannot recognize any extent of trouble.
- [c18] 18. The navigation device according to claim 3, wherein the notifier notifies that there is no trouble when the trouble extent recognizer cannot recognize any extent of trouble.
- [c19] 19. The navigation device according to claim 8, wherein the notifier notifies that there is no trouble when the trouble extent recognizer cannot recognize any extent of trouble.
- [c20] 20. The navigation device according to claim 10, wherein the notifier notifies that there is no trouble when the

trouble extent recognizer cannot recognize any extent of trouble.

- [c21] 21. A navigation system comprising:
- a server having a storage for storing map information;
 - and
 - a navigation device for acquiring the map information from the server via a network, which comprises:
 - a map information acquirer for acquiring map information;
 - a current position information acquirer for acquiring current position information on a current position of a moving body;
 - a destination information acquirer for acquiring destination information on a location of a destination to which the moving body moves;
 - a traffic information acquirer for acquiring traffic information on a traffic condition relating to the moving body;
 - a traveling route searcher that can search a plurality of traveling routes of the moving body on the basis of the current position information and the destination information and by using the map information;
 - a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic in-

formation acquired by the traffic information acquirer;
and
a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

- [c22] 22. A navigation system comprising:
a server having a storage for storing map information;
and
a navigation device for acquiring the map information from the server via a network, which comprises:
a map information acquirer for acquiring map information;
a current position information acquirer for acquiring current position information on a current position of a moving body;
a destination information acquirer for acquiring destination information on a location of a destination to which the moving body moves;
a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal el-

ement;

a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information;

a traveling route searcher that can search a plurality of traveling routes of the moving body on the basis of the current position information and the destination information and by using the map information;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic condition recognizer; and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

[c23] 23. A navigation system comprising:

a server having a storage for storing map information; and

a navigation device for acquiring the map information

from the server via a network, which comprises:

- a map information acquirer for acquiring map information;
- a current position information acquirer for acquiring current position information on a current position of a moving body;
- a traffic information acquirer for acquiring traffic information on a traffic condition relating to the moving body;
- a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic information acquirer;
- a traveling route searcher for searching a plurality of traveling routes to avoid an area with the trouble using the map information on the basis of the current position information by recognizing the trouble and the extent of trouble by the trouble extent recognizer; and
- a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

[c24] 24. A navigation system comprising:
a server having a storage for storing map information;
and
a navigation device for acquiring the map information from the server via a network, which comprises:
a map information acquirer for acquiring map information;
a current position information acquirer for acquiring current position information on a current position of a moving body;
a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;
a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information;
a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on the basis of the traffic condition recognized by the traffic condition recognizer;
a traveling route searcher that can search a plurality of traveling routes to avoid an area with the trouble using the map information on the basis of the current position information by recognizing the trouble and the extent of

trouble by the trouble extent recognizer; and
a notifier for notifying at least one of the plurality of
traveling routes searched by the traveling route searcher,
wherein the traveling route searcher searches the travel-
ing route so as to increase a number of traveling routes
to be notified by the notifier as a function of increase in
the extent of trouble as recognized by the trouble extent
recognizer.

- [c25] 25. A navigation system comprising:
a server having a map information storage for storing
map information and a statistic traffic information stor-
age for storing statistic traffic information; and
a navigation device for acquiring the map information
and the statistic traffic information from the server via a
network, which comprises:
a map information acquirer for acquiring map informa-
tion;
a current position information acquirer for acquiring
current position information on a current position of a
moving body;
a destination information acquirer for acquiring destina-
tion information on a location of a destination to which
the moving body moves;
a traffic information acquirer for acquiring traffic infor-
mation on a traffic condition relating to the moving

body;

a traveling route searcher that can search a plurality of traveling routes of the moving body on the basis of the current position information and the destination information and by using the map information;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic information acquirer; and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer,

the device further comprising:

a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element; and

a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information,

wherein the trouble extent recognizer recognizes the extent of trouble on the basis of at least the traffic information acquired by the traffic information acquirer or the traffic condition recognized by the traffic condition recognizer.

- [c26] 26. A navigation system comprising:
- a server having a map information storage for storing map information and a statistic traffic information storage for storing statistic traffic information; and
 - a navigation device for acquiring the map information and the statistic traffic information from the server via a network, which comprises:
 - a map information acquirer for acquiring map information;
 - a current position information acquirer for acquiring current position information on a current position of a moving body;
 - a destination information acquirer for acquiring destination information on a location of a destination to which the moving body moves;
 - a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;
 - a traffic condition recognizer for recognizing a traffic

condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information;

a traveling route searcher that can search a plurality of traveling routes of the moving body on the basis of the current position information and the destination information and by using the map information;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic condition recognizer; and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

[c27] 27. A navigation system comprising:

a server having a map information storage for storing map information and a statistic traffic information storage for storing statistic traffic information; and

a navigation device for acquiring the map information and the statistic traffic information from the server via a

network, which comprises:

a map information acquirer for acquiring map information;

a current position information acquirer for acquiring current position information on a current position of a moving body;

a traffic information acquirer for acquiring traffic information on a traffic condition relating to the moving body;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on each of the searched traveling routes on the basis of the traffic information acquired by the traffic information acquirer;

a traveling route searcher for searching a plurality of traveling routes to avoid an area with the trouble using the map information on the basis of the current position information by recognizing the trouble and the extent of trouble by the trouble extent recognizer; and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer

the device further comprising:

a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element; and
a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information,
wherein the trouble extent recognizer recognizes the extent of trouble on the basis of at least the traffic information acquired by the traffic information acquirer or the traffic condition recognized by the traffic condition recognizer.

- [c28] 28. A navigation system comprising:
a server having a map information storage for storing map information and a statistic traffic information storage for storing statistic traffic information; and
a navigation device for acquiring the map information and the statistic traffic information from the server via a network, which comprises:
a map information acquirer for acquiring map information;
a current position information acquirer for acquiring current position information on a current position of a moving body;

a statistic traffic information acquirer for acquiring statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;

a traffic condition recognizer for recognizing a traffic condition at a predetermined clock time of a predetermined date on the basis of the statistic traffic information;

a trouble extent recognizer for recognizing an extent of trouble for the moving body to move on the basis of the traffic condition recognized by the traffic condition recognizer;

a traveling route searcher that can search a plurality of traveling routes to avoid an area with the trouble using the map information on the basis of the current position information by recognizing the trouble and the extent of trouble by the trouble extent recognizer; and

a notifier for notifying at least one of the plurality of traveling routes searched by the traveling route searcher, wherein the traveling route searcher searches the traveling route so as to increase a number of traveling routes to be notified by the notifier as a function of increase in the extent of trouble as recognized by the trouble extent recognizer.

acquiring map information, current position information on a current position of a moving body, destination information on a location of a destination to which the moving body moves and traffic information on a traffic condition relating to the moving body;
recognizing an extent of trouble using the map information for the moving body to move on each of traveling routes searched on the basis of the current position information and the destination information on the basis of the traffic information; and
increasing a number of traveling routes to be notified as a function of increase in the recognized extent of trouble.

- [c30] 30. A navigation method comprising the steps of:
acquiring map information, current position information on a current position of a moving body, destination information on a location of a destination to which the moving body moves and a traffic condition at a predetermined clock time of a predetermined date provided on the basis of statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;
recognizing an extent of trouble using the map information for the moving body to move on each of traveling routes searched on the basis of the current position in-

formation and the destination information on the basis of the traffic condition; and
increasing a number of traveling routes to be notified as a function of increase in the recognized extent of trouble.

[c31] 31. A navigation method comprising the steps of:
acquiring map information, current position information on a current position of a moving body and traffic information on a traffic condition relating to the moving body;
recognizing a trouble and an extent of trouble for the moving body to move on a traveling route on the basis of the traffic information; and
searching a traveling route for avoiding an area with the trouble on the basis of the current position information, using the map information, so as to increase a number of traveling routes for avoiding the area with the trouble as a function of increase in the recognized extent of trouble.

[c32] 32. A navigation method comprising the steps of:
acquiring map information, current position information on a current position of a moving body and a traffic condition at a predetermined clock time of a predetermined date provided on the basis of statistic traffic information obtained by statistically processing a past traffic condi-

tion in terms of a temporal element;
recognizing a trouble and an extent of trouble for the moving body to move on the basis of the traffic condition; and
searching a traveling route for avoiding an area with the trouble on the basis of the current position information, using the map information, so as to increase a number of traveling routes for avoiding the area with the trouble as a function of increase in the recognized extent of trouble.

- [c33] 33. A navigation program operatable in a computer for performing a navigation method, the program including a set of computer-executable instructions stored on a recording medium, the set of instructions comprising at least an instruction for:
- acquiring map information, current position information on a current position of a moving body, destination information on a location of a destination to which the moving body moves and traffic information on a traffic condition relating to the moving body;
 - recognizing an extent of trouble using the map information for the moving body to move on each of traveling routes searched on the basis of the current position information and the destination information on the basis of the traffic information; and

increasing a number of traveling routes to be notified as a function of increase in the recognized extent of trouble.

- [c34] 34. A navigation program operatable in a computer for performing a navigation method, the program including a set of computer-executable instructions stored on a recording medium, the set of instructions comprising at least an instruction for:
- acquiring map information, current position information on a current position of a moving body, destination information on a location of a destination to which the moving body moves and a traffic condition at a predetermined clock time of a predetermined date provided on the basis of statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;
 - recognizing an extent of trouble using the map information for the moving body to move on each of traveling routes searched on the basis of the current position information and the destination information on the basis of the traffic condition; and
 - increasing a number of traveling routes to be notified as a function of increase in the recognized extent of trouble.

[c35] 35. A navigation program operatable in a computer for performing a navigation method, the program including a set of computer-executable instructions stored on a recording medium, the set of instructions comprising at least an instruction for:

acquiring map information, current position information on a current position of a moving body and traffic information on a traffic condition relating to the moving body;

recognizing a trouble and an extent of trouble for the moving body to move on a traveling route on the basis of the traffic information; and

searching a traveling route for avoiding an area with the trouble on the basis of the current position information, using the map information, so as to increase a number of traveling routes for avoiding the area with the trouble as a function of increase in the recognized extent of trouble.

[c36] 36. A navigation program operatable in a computer for performing a navigation method, the program including a set of computer-executable instructions stored on a recording medium, the set of instructions comprising at least an instruction for:

acquiring map information, current position information on a current position of a moving body and a traffic con-

dition at a predetermined clock time of a predetermined date provided on the basis of statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;

recognizing a trouble and an extent of trouble for the moving body to move on the basis of the traffic condition; and

searching a traveling route for avoiding an area with the trouble on the basis of the current position information, using the map information, so as to increase a number of traveling routes for avoiding the area with the trouble as a function of increase in the recognized extent of trouble.

[c37] 37. A recording medium having recorded thereon a set of computer-executable instructions for performing a navigation method, the set of instructions comprising at least an instruction for:

acquiring map information, current position information on a current position of a moving body, destination information on a location of a destination to which the moving body moves and traffic information on a traffic condition relating to the moving body;

recognizing an extent of trouble using the map information for the moving body to move on each of traveling routes searched on the basis of the current position in-

formation and the destination information on the basis of the traffic information; and
increasing a number of traveling routes to be notified as a function of increase in the recognized extent of trouble.

- [c38] 38. A recording medium having recorded thereon a set of computer-executable instructions for performing a navigation method, the set of instructions comprising at least an instruction for:
- acquiring map information, current position information on a current position of a moving body, destination information on a location of a destination to which the moving body moves and a traffic condition at a predetermined clock time of a predetermined date provided on the basis of statistic traffic information obtained by statistically processing a past traffic condition in terms of a temporal element;
 - recognizing an extent of trouble using the map information for the moving body to move on each of traveling routes searched on the basis of the current position information and the destination information on the basis of the traffic condition; and
 - increasing a number of traveling routes to be notified as a function of increase in the recognized extent of trouble.

[c39] 39. A recording medium having recorded thereon a set of computer-executable instructions for performing a navigation method, the set of instructions comprising at least an instruction for:

acquiring map information, current position information on a current position of a moving body and traffic information on a traffic condition relating to the moving body;

recognizing a trouble and an extent of trouble for the moving body to move on a traveling route on the basis of the traffic information; and

searching a traveling route for avoiding an area with the trouble on the basis of the current position information, using the map information, so as to increase a number of traveling routes for avoiding the area with the trouble as a function of increase in the recognized extent of trouble.

[c40] 40. A recording medium having recorded thereon a set of computer-executable instructions for performing a navigation method, the set of instructions comprising at least an instruction for:

acquiring map information, current position information on a current position of a moving body and a traffic condition at a predetermined clock time of a predetermined date provided on the basis of statistic traffic information

obtained by statistically processing a past traffic condition in terms of a temporal element;

recognizing a trouble and an extent of trouble for the moving body to move on the basis of the traffic condition; and

searching a traveling route for avoiding an area with the trouble on the basis of the current position information, using the map information, so as to increase a number of traveling routes for avoiding the area with the trouble as a function of increase in the recognized extent of trouble.